

What is claimed is:

1. A variable optical delay line with a large continuous tuning range comprising:

an incremental variable optical delay line for receiving an optical signal the incremental
5 variable delay line comprising a plurality of switchable binary paths configured to provide signal
delay paths selected from a sequence of incrementally differing delays; and

serially optical coupled with the incremental delay line, a continuously variable optical
delay line for receiving the optical signal to provide a continuous delay from a range of delays
substantially encompassing a delay increment in the incremental delay line.

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2. The variable optical delay line of claim 1 wherein the incremental variable delay line
is configured to provide a sequence of delays that differ by a delay increment T and the
continuously variable optical delay line provides a delay in the continuous range $(0, T)$.

15 3. The variable optical delay line of claim 1 wherein the incremental variable delay line
comprises a plurality of switchable binary fixed delays in which one delay is substantially 0 and
the other delay is substantially $(2n+1)T$ where T is the delay increment and n is an integer ≥ 0 .

20 4. The variable optical delay line of claim 3 wherein the incremental variable delay line
comprises a switchable binary fixed delay of $(0, T)$ serially connected to a switchable binary
delay of $(0, 2T)$, where T is the delay increment.

5. The variable optical delay line of claim 1 wherein the continuously variable optical delay line comprises a switchable binary delay in which one delay is substantially zero and the other delay is a continuous delay in the range $(0, T)$ where T is the delay increment.

5 6. The variable optical delay of claim 1 wherein the continuously variable optical delay line comprises a switchable binary delay line in which one delay is a continuous delay in the range $(0, T)$ and the other delay is a continuous in the range $(T, 2T)$, where T is the delay increment.

10 7. The variable optical delay line of claim 1 wherein the continuously variable optical delay line comprises an all pass filter.